Case for a disk

FIELD OF THE INVENTION

The present invention is related to a case for a disk, especially for an optical disk or a magnetic disk or a magneto-optical disk. Such a case is also often called container or caddy. The invention is further related to a case accommodating such a disk.

BACKGROUND AND PRIOR ART

The function of a case is to protect a disc positioned inside the case from damages like scratches, fingerprints, dust or the like. When access to data stored on the disk is needed, the case has to be inserted into a loading slot of e.g. a disk drive, thereby opening an access window of the case providing access to the disk.

Cases known from prior art have a rectangular shape and a moveable slider positioned at one side of the case. In a closed position of the case the slider covers an access window within the case. When the case is inserted into the loading slot, the slider will be pushed away by mechanical components or parts inside the disk drive, thereby opening the access window of the case and thereby providing access to the disk.

SUMMARY OF THE INVENTION

The present invention provides a case for a disk, especially for an optical disk or a magnetic disk or a magneto-optical disk, comprising at least two shells, whereby said at least two shells are rotatable around at least one axis between a closed position and an open position, whereby outer side walls of said shells define a triangular shape of the case in said closed position of the case, and whereby inner side walls of said shells define an access window in said open position of the case providing access to the disk through said access window. In said open position of the case at least portions of said outer side walls run approximately parallel to each other. Under the expression "a triangular shape" is also to be understood a more or less triangular form or even a conical form. The access window is provided at one side of the case by the relative rotation of the shells. The access window is defined by the inner side walls of the rotating shells. During the rotation of the shells and the

opening of the case, no dust or other dirt will be moved into the access window. This often happens with cases known from prior art.

The case is insertable into a loading slot of a disk drive or the like, whereby the case will be automatically transferred from said closed position into said open position while inserting the case into said loading slot without the need of any additional mechanical components or parts inside the disk drive.

In accordance with a preferred embodiment of the invention, the shells are directly coupled together for mutually rotation around one axis, whereby said one rotation axis coincides with a center of the disk.

In accordance with an alternative preferred embodiment of the invention, the shells are coupled together by mounting both shells to a support member for mutually rotation around two axes, whereby said two rotation axes are positioned with a distance from a center of the disk.

Further preferred embodiments are described in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a top-view of a case for a disk according to a first preferred embodiment of the present invention in closed position of the case;

Figure 2 shows a top-view of the case according to figure 1 in an open position of the case;

Figure 3 shows a bottom-view of the case according to figures 1 and 2 in the closed position of the case;

Figure 4 shows a bottom-view of the case according to figures 1 to 3 in the open position of the case;

Figure 5 shows a perspective bottom-view of the case according to figures 1 to 4 in the open position of the case;

Figure 6 shows the left half of the case according to figure 3;

Figure 7 shows a cross-section through the case according to figures 1 to 6 in direction VII-VII shown in figures 3 and 6;

Figure 8 shows the case according to figures 1 to 8 in the closed position together with a loading slot of a disk drive;

Figure 9 shows the case according to figures 1 to 8 in the open position together with the loading slot of a disk drive;

Figure 10 shows a top-view of a case for a disk according to a second preferred embodiment of the present invention in a closed position of the case;

Figure 11 shows a top-view of the case according to figure 10 in an open position of the case;

Figure 12 shows a bottom-view of the case according to figures 10 and 11 in the closed position of the case;

Figure 13 shows a bottom-view of the case according to figures 10 to 12 in the open position of the case;

Figure 14 shows the left half of the case according to figure 12; and

Figure 15 shows a cross section through the case according to figures 10 to 14 in direction XV-XV shown in figures 12 and 14.

DETAILED DESCRIPTION

Figs. 1 to 9 show different views an example of of a case 1 for a disk according to a first preferred embodiment of the invention, whereby Figs. 1 and 3 show a top-view and a bottom-view of the case 1 in a closed position and whereby Figs. 2, 4 and 5 show a top-view and bottom-views of the case 1 in an open position. Figs. 8 and 9 show the case 1 together with a loading slot 2 of a disk drive in which the case 1 has to be inserted to provide access to a disk 3 positioned within the case 1.

The case 1 according to Figs. 1 to 9 comprises two shells 4 and 5. Each of the shells 4 and 5 provide one half of the case 1. The shells 4 and 5 are mounted to a support member 6, whereby the two shells 4 and 5 can rotate relatively to each other and relatively to the support member 6. As shown in Figs. 1 to 4, each of the shells 4 and 5 rotates around one axis 7 and 8. The shell 5 rotates around the axis 7 and the shell 4 rotates around the axis 8. As shown in Fig. 4, the two rotation axis 7 and 8 are positioned with a distance from a center 9 of the disk 3. A portion 10 of the support member 6 serves as grip or handle for an easy insertion of the case 1 into the loading slot 2.

Each of the two shells 4 and 5 comprises outer side walls 11 and inner side walls 12. In the closed position of the case (see Figs. 1 and 3) the inner side walls 12 are positioned adjacent to each other and are in contact with each other. The outer side walls 11 converge to a front end 13 of the case 1. In the closed position of the case 1 the outer side walls 11 define a conical or triangular shape of the case 1.

In order to open the case 1 or to transfer the case 1 from the closed position according to Figs. 1 and 3 into the open position according to Figs. 2 and 4, the shells 4 and 5

can be mutually rotated around the axes 7 and 8, whereby due to the rotation of the shells 4 and 5 the inner side walls 12 of the shells 4 and 5 are moved away from each other and create thereby an access opening or access window 14 between the two inner side walls 12 at least in the region of the front end 13. After the movement of the shells 4 and 5 in the open position of the case 1, at least portions of said outer side walls 11 run approximately parallel to each other. The access window 14 provides access to the disk 3 and therefore access to data stored on the disk 3.

As shown in Figs. 8 and 9, the case 1 is suitable for insertion into a loading slot 2 of a disk drive. The loading slot 2 has a width W_2 defined by boundary walls 15 of the loading slot 2. The case 1 carrying the disk 3 can be inserted into the loading slot 2 with its front end 13. It can be taken from Fig. 8 that the width $W_{1,C}$ of the case 1 in the closed position is broader or greater than the with W_2 of the loading slot. The width $W_{1,C}$ of the case 1 in the closed position is defined by rear ends 16 of the side walls 11 of the shells 4 and 5, whereby the rear ends 16 are positioned at the opposite end of the case 1 relative to the front end 13.

The case 1 in its closed position can be inserted with its front end 13 into the loading slot 2, until the outer side walls 11 get in contact with the boundary walls 15 of the loading slot. When the outer side walls 11 of the case 1 get in contact with the boundary walls 15 of the loading slot 2 and the insertion of the case 1 into the loading slot 2 is continued, the shells 4 and 5 start automatically to rotate around the axes 7 and 8. During the continued insertion of the case 1 into the loading slot 2, the case 1 will be transferred from its closed positioned (see Fig. 8) into its open position (see Fig. 9). The access window 14 will be automatically opened with the insertion of the case 1 into the loading slot 2. No additional mechanical means are required inside the loading slot 2 to open the access window 14 of the case 1.

It can be taken from Fig. 9 that the width W_2 of the loading slot 2 corresponds approximately to the diameter of the disk 3 plus the play of the disk 3 within the case 1 plus the thickness of the outer side walls 11 of the case 1. The width $W_{1,O}$ of the case 1 in the open position corresponds approximately to the width W_2 of the loading slot 2.

It can be taken from Figs. 6 and 8 that each of the shells 4 and 5 comprise recesses 17 at the inner side walls 12 in the region opposite to the front end 13 of the case. This allows the rotation of the shells 4 and 5 during the insertion of the case 1 in the loading slot 2 around the axes 7 and 8, whereby boundaries of the adjacent recesses 17 within the inner side walls 12 serve as stroke or backstop to limit the rotation of the shells 4 and 5

relatively to each other. Due to the fact that the recesses 17 are provided in the inner side walls 12 of the shells 4 and 5, the thickness of the shells 4 and 5 or the thickness of the inner side walls 12 of the shells 4 and 5 can be identically the same. It is not necessary to push or insert one of the shells 4 or 5 into the other shell 5 or 4 during the rotation of the shells.

Figs. 10 to 15 show a second preferred embodiment of a case 18 for a disk 19. The case 18 according to Figs. 10 to 15 comprises again two shells 20 and 21, each of the shells 20 and 21 providing one half of the case 18. The shells 20 and 21 of the case 18 are in contrary to the embodiment according to Figs. 1 to 9 not connected to a support member but directly coupled to each other for relative rotation of the two shells 20 and 21 around one axis 22. The rotation axis 22 of the two shells 20 and 21 coincides with the center 23 of the disk 19 positioned inside the case 18.

The main differences between the embodiments according to Figs. 1 to 9 and Figs. 10 to 15 are that according to the second embodiment of Figs. 10 to 15 the two shells 20 and 21 rotate mutually around one axis 22 and that the two shells 20 and 21 are directly coupled to each other. In the first embodiment according to Figs. 1 to 9, the two shells 4 and 5 rotate mutually to each other around two axes 7 and 8, and the two shells 4 and 5 are mounted to a support member 6 and therefore coupled indirectly together.

It can be taken from Figs. 10 and 12 that the case 18 has a triangular shape in the closed position of the case 18. Outer side walls 24 of the shells 20 and 21 are in the closed position of the case 18 converging to a front end 25 of the case 18. Inner side walls 26 of the shells 20 and 21 are in the closed position of the case 18 in contact with each other.

In order to provide access to the disk 19 positioned within the case 18, the two shells 20 and 21 of the case 18 can be mutually rotated around the axis 22 thereby creating an access window 27 between the two inner side walls 26 to provide access to the disk 19. In the open position of the case 18 (see Figs. 11 and 13) the outer side walls 24 of the two shells 20 and 21 run approximately parallel to each other.

One of the two shells 20 and 21, in the shown embodiment the shell 21, comprises a portion 28, which has to be pushed or inserted into the other shell 20 during the rotation of the two shells 20 and 21 around the axis 22. Figs. 14 illustrates a recess 29 within the shell 20, into which the portion 28 of the shell 21 can be inserted during the rotation of the two shells 20 and 21 to open the access window 27 between the two inner side walls 26 at the front end 25 of the case 18.

With the present invention, a new design for a case or a so-called container or caddy for a disk is provided to protect the disk from damages like scratches, fingertips, dust

or the like. Outer side walls of the case define in the closed position of the case a conical or triangular shape of the case. The case can easily be opened by simply inserting the case into a loading slot of a disk drive or the like. The case comprises two shells, which can rotate mutually to each other around one axis or two axes. In case the two shells rotate around one axis which coincides with the center of the disk inside the case, the two shells are coupled directly together. In case the two shells rotate around two axes, the two shells are coupled indirectly together by mounting them to a support member. The case opens automatically during the insertion of the case into the loading slot. No additional mechanical means are necessary inside the loading slot to open an access window to allow access to the disk. During the rotation of the shells and the opening of the case, no dust or other dirt will be moved into the access window.

LIST OF REFERENCE NUMERALS

1	case
2	loading slot
3	disk
4	shell
5	shell
6	support member
7	axis
8	axis
9	center
10	portion
11	outer side wall
12	inner side wall
13	front end
14	access window
15	boundary wall
16	rear end
17	recess
18	case
19	disk
20	shell
21	shell
22	axis
23	center
24	outer side wall
25	front end
26	inner side wall
27	access window
28	portion
29	recess